

## Comparative Morphology of the Weevil Larvae of the Superfamily Curculionoidea in Korea(Coleoptera) ( I )\*

한국산 바구미類 幼蟲의 比較形態에 관한 연구( I )

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**ABSTRACT** This study was made to describe the morphological features of larvae of *Pissodes nitidus*, *Pissodes obscurus*, *Shirahoshizo insidiosus*, *Curculio sikkimensis*, *Cryptorhynchus lapathi* of Curculionidae and *Apoderus jekeli*, *Byctiscus puberulus regalis*, *Euops splendidus*, *Rhynchites heros* of Attelabidae and *Sipalinus gigas* of Rhynchophoridae.

**KEY WORDS** Comparative morphology, larvae, Curculionoidea

**초 록** 본 研究는 바구미科(Curculionidae)의 노랑무늬솔바구미(*Pissodes nitidus*), 노랑점검바구미(*Pissodes obscurus*), 흰점박이바구미(*Shirahoshizo insidiosus*), 밤바구미(*Curculio sikkimensis*), 벼들바구미(*Cryptorhynchus lapathi*) 그리고 거위벌레科(Attelabidae)의 거위벌레(*Apoderus jekeli*), 단풍나무거위벌레(*Byctiscus puberulus regalis*), 루리거위벌레(*Euops splendidus*), 복숭아거위벌레(*Rhynchites heros*) 그리고 왕바구미科(Rhynchophoridae)의 왕바구미(*Sipalinus gigas*) 幼蟲의 形態學의 特性을 관찰하였다.

**검 색 어** 比較形態, 幼蟲, 바구미上科

In comparison with many other families of beetles, the weevil larvae have received only minor interest from entomologists. Main reason for this may be the difficulty in separating the larvae into species due to their uniformity.

The descriptions of weevil larvae in the older literatures are mostly very schematic and quite useless for identification. Eichelbaum(1903) and Hopriins(1905) are probably the first of those who studied the larval characters of weevils in detail. Emden(1938-1952) evaluated the

taxonomic characters and published excellent papers on the larvae with two tergal folds and on the Curculionidae Adelognatha and Alophinae.

The terminology for the systematics of the weevil larvae was reviewed by Anderson(1947) to make a standard for the description.

### MATERIALS AND METHODS

The gross morphological features of entire larvae were examined on alcohol-preserved material. Then, they were macerated in 10% KOH for several minutes and dissected under a stereoscopic microscope.

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\*This paper was supported (in part) by NON DIRECTED RESEARCH FUND(Korea Research Foundation, 1989).

The head capsule with attached mouthparts was first removed from the body by a cut made with a fine forceps around the edges of the occipital foramen. The maxillae and labium as a unit were removed from the head capsule and the mandibles were dilated. The head was sketched by this condition from dorsal and ventral sides. Then the mandibles with attached tendons were removed from the head capsule. Mouth parts and skins were mounted on microscopic slides for detailed examinations.

### Comparative Morphology of the Weevil Larvae

#### 1. *Pissoedes nitidus* Roelofs

노랑무늬솔바구미(Fig. 1.)

Pissodes: Hopkins, 1911, V. S. D. A., Bur. Ent., Tech.

Anderson, 1947. Proc. Ent. Soc. Wash., 49: 123

Body moderately curved, cylindrical, with relatively coarse skin-points.

Head free, dark orange, as long as wide, broadest at the middle, rounded posteriorly. Anterior ocellus present, posterior ocellus absent. Antenna with one conical segment and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal suture distinguishable throughout its length. Epicranial suture more than one-half as long as head. Endocarina distinct, approximately one-half as long as frons. Frons with five pairs of setae, setae 1, 2 and 3 short to moderately long, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderate-

ly long, nearly twice as long as 2. Anterior margin of labrum trilobed, with strong median extension of posterior margin into clypeal zone. Labral setae 1 and 2 short to moderately long, nearly twice as long as 3. Median and paired lateral sensilla present on labrum. Labral rods long and convergent posteriorly, epipharynx asperate. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx with or without asperities. Mandible with two apical teeth. Mandibular seta 1 short, slightly longer than and directly behind 2. Labial palpus with two segments, apical segment longer than wide. Premental sclerite complete, with anterior and posterior median extensions. Postmentum with three pairs of setae, posterior pair separated by a distance approximately one-half as great as that between setae of middle pair. Maxillary palpus with two segments, basal segment without accessory process, with one very short lateral seta, apical segment without lateral setae, apical segment longer than wide. Mala with five ventral and seven dorsal setae.

Pronotum with ten setae. Thoracic spiracle bicameral, with surrounding wrinkles. Prodorsum of meso- and metathorax with one short setae. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short setae. Spiracular area with two setae, one very short. Epipleurum with one setae. Pleurum of prothorax with two setae, of meso- and metathorax with a setae. Pedal area with seven setae, one moderately long, the remainder shorter and subequal to sternal seta. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spira-

cles all lateral, bicameral, with surrounding wrinkles. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum with five setae, 2 and 4 long. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes.

Width of head: 1.0 mm

Materials examined: Kangweon-Do, Chunchon City, 10. VII. 1990.  
*Pinus densiflora*

## 2. *Pissodes obscurus* Roelofs

노랑점검바구미 (Fig. 2.)

Body moderately curved, cylindrical, with relatively coarse 3 skin-points.

Head free, dark orange, as long as wide, broadest at the middle, rounded posteriorly. Anterior ocellus present, posterior ocellus absent. Antenna with one conical segment and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal suture distinguishable throughout its length. Epicranial suture more than one-half as long as head. Endocarina distinct, approximately one-half as long as frons. Frons with five pairs of setae, setae 1, 2 and 3 short to moderately long, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present.

Clypeal seta 1 short to moderately long, near-

ly twice as long as 2. Anterior margin of labrum trilobed, with strong median extension of posterior margin into clypeal zone. Labral setae 1 and 2 short to moderately long, nearly twice as long as 3. Median and paired lateral sensilla present on labrum. Labral rods subparallel, short, epipharynx not asperate. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines. Epipharyngeal sensory pores in two clusters, three in each cluster, between the anterior and posterior pairs of median spines. Epipharynx with or without asperities. Mandible with two apical teeth. Mandibular seta 1 short, slightly longer than and directly behind 2. Labial palpus with two segments, apical segment longer than wide. Premental sclerite complete, with anterior and posterior median extensions. Postmentum with three pairs of setae, posterior pair separated by a distance approximately one-half as great as that between setae of middle pair. Maxillary palpus with two segments, basal segment without accessory process, with one very short lateral seta, apical segment without lateral seta, apical segment longer than wide. Mala with five ventral and seven dorsal setae.

Pronotum with ten setae. Thoracic spiracle bicameral, with surrounding wrinkles. Prodorsum of meso- and metathorax with one short seta. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with two setae, one very short. Epipleurum with one seta. Pleurum of prothorax with two setae, of meso- and metathorax with a seta. Pedal area with seven setae, one moderately long, the remainder shorter and subequal to sternal seta. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles all lat-

eral, bicameral, with surrounding wrinkles. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum with five setae, 2 and 4 short. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes.

Width of head: 1.3 mm

Materials examined: Kyonggi-Do, Kapyong-gun, 5, X i. 1989. *Pinus koraiensis*

### 3. *Shirahoshizo insidiosus* (Reolofs)

흰점박이바구미 (Fig. 3.)

Body moderately curved, nearly cylindrical.

Head free, nearly circular in outline, as long as wide. Anterior ocellus present. Antenna with a conical segment and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal suture distinct. Endocarina distinct, approximately one-half as long as frons. Frons with five pairs of setae, setae 1, 2 and 3 short to moderately long, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Anterior margin of labrum trilobed, posterior margin extended into clypeal zone. Median and paired lateral sensilla present on labrum. Labral setae 1 and 2 short to moderately long, nearly twice as long as 3. Labral rods moderately long and stout,

conjoined at posterior ends. Epipharynx with dense fine hairy asperities between labral rods, with three anterolateral setae, six anteromedian setae and four spines. Epipharyngeal sensory pores in two clusters, Mandible with two apical teeth and an angulation or tooth near middle of dorsal edge, longer than wide. Mandibular seta placed parallel to the base. Labial palpus with two segments. Premental sclerite complete, with anterior and posterior median extensions. Postmentum with three pairs of setae. Maxillary palpus with two segments, basal segment without accessory process, with one short lateral seta, apical segment without lateral seta, Mala with five ventral and seven dorsal setae.

Pronotum with nine setae. Thoracic spiracle bicameral, air-tubes shorter than peritreme, the latter pigmented. Spiracular area of mesothorax with two setae, one moderately long, one very short. Prodorsum of meso- and metathorax with a seta. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with two setae, one short to minute, the other long. Epipleurum with a long seta. Pleurum of prothorax with two long setae, of meso- and metathorax with a long seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral setae of pedal area subequal to short sternal seta. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, bicameral, much smaller than those on pronotum, air-tubes a little shorter than peritreme, peritreme circular, inside densely asperate and visibly pale brownish. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum with five setae, 1, 2, and 4 short, subequal, 3

and 5 long, subequal. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleurum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes.

Width of head: 1.7 mm

Materials examined: Kangweon-Do, Woengsong-Gun, 10. X. 1989. *Pinus densiflora*

#### 4. *Curculio sikkimensis* (Heller)

밤바구미 (Fig. 4.)

Balaninus: Gadner, 1934, Ind. For. Rec., 20: 27

Body very stout, moderately curved.

Head free, slightly retracted, brown to dark orange, slightly broader than long, broadest at the middle. Anterior ocellus present, posterior ocellus absent. Antenna with a conical segment and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon eadily discernible. Frontal suture distinguishable throughout its length. Epicranial suture more than one-half as long as head. Endocarina distinct, nearly one-half as long as frons, or indistinct. Frons with five pairs of setae, setae 1, 2 and 3 short, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial setae 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal setae 1 short to moderately long, nearly twice as long as 2. Anterior margin of labrum trilobed. Labal setae 1 and 2 short to moderately long, nearly twice as long as 3. Median and paired lateal sensilla present on la-

brum. Labralrods moderately short, sometime indistinct. Epipharynx with three anterolateral setae, six anteromedian setae and four median spines. Epipharyngeal sensory pores in two clusters, three in each cluster, near the anterior median spines. Epipharynx without asperities. Mandible with two apical teeth, longer than wide. Mandibular setae 1 short, slightly longer than and directly behind 2. Labial palpus with two segments, apical and basal segment longer than wide. Prementum sclerite complete, with anterior and posterior median extensions. Postmentum with three pairs of setae, posterior pair separated by a distance approximately one-half as great as that between the middle pair of setae. Maxillary pair with two segments, the basal segment with two sensilla and one very short lateral setae, apial segment without lateral setae. Mala with five ventral setae of which the median two setae short and situated close to each other, and with five to eight dorsal setae.

Pronotum with ten setae, position and length variable. Thoracic spiracle bicameral. Prodorsum of meso- and metathorax with one short setae. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 long, subequal. Alar area with one short setae. Spiracular area with two setae, one moderately long, one very short. Epipleurum with one setae. Pleurum of prothorax with two setae, of meso- and metathorax with one setae. Pedal area with seven setae, one moderately long, the remainder shorter. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all ateral, bicameral. Typical abdominal segments with three dorsal folds. Prodorsum with one short setae. Postdorsum with five setae, 1, 2 and 4 short, subequal, 3 and 5 long, subequal. Spiracular area with two setae, setae

1 very short, seta 2 short. Epipleum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other slightly longer. Pedal area with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, X-shaped.

Width of head: 1.0 mm

Materials examined: Kangweon-Do, Chunsong  
-Gun, 10. XI. 1990. fruit  
of *Castanea crenata*

##### 5. *Cryptorhynchus lapathi* Linne

버들바구미 (Fig. 5.)

*Cryptorhynchus lapathi*: Peterson, 1951, Larv.  
Ins., 2: 128

Body moderately curved, attenuated posteriorly.

Head free, circular in outline, slightly longer than wide, Anterior ocellus present. Antenna with one conical segment and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible. Frontal suture distinct. Endocarina distinct, approximately one-half as long as frons. Frons with five pairs of setae, setae 1, 2 and 3 short to moderately long, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Anterior margin of labrum weakly trilobed, Posterior margin extended into clypeal zone. Labral setae 1, 2 and 3 long, subequal. Median and paired lateral sensilla present on labrum. Labral rods moderately elongate and long, stout, subparallel. Epipharynx with dense hair-like asperities between labral rods, with three anterolateral

setae, six nteromedian setae and four median spines. Epipharyngeal sensorypores in two clusters. Mandible with two apical teeth, with an abtuse tooth near the middle of cutting edge, longer than wide. Mandibular seta 1 short, slightly longer than and directly behind 2, setae parallel to the base. Labial palpus with two segments. Premental sclerite complete, with anterior and posterior median extensions. Postmentum with three pairs of setae. Maxilla palpus with two segments, basal segment without accessory process, with one very short lateral seta, apical segment without lateral setae, Mala with five ventral and seven dorsal setae.

Pronotum with ten setae. Thoracic spiracle bicameral, air-tubes subequal in length to each other, almost as long as the minor axis of peritreme. Prodorsum of meso- and metathorax with one short seta. Postdorsum of meso- and metathorax with four setae, setae 1 and 2 short, subequal, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with a seta. Epipleum with a seta. Pleurum of prothorax with two setae, of meso- and metathorax with a seta. Pedal area with seven setae, one moderately long, the remainder shorter. Most ventral seta of pedal area subequal to very short sternal seta. Sternal setae subequal to eusternal setae.

Abdomen with eight pairs of spiracles. Spiracles all lateral, bicameral, much smaller than those on pronotum, air-tubes subequal in length to each other. Typical abdominal segments with three dorsal folds. Prodorsum with one short seta. Postdorsum with five setae 1, 2 and 4 short, subequal, 3 and 5 moderately long, subequal. Spiracular area with two setae, seta 1 very short, seta 2 short. Epipleum with two setae, one short, the other slightly longer. Pleurum with two setae, one short, the other

slightly longer. Pedal ara with one short seta. Eusternum with two very short setae. Sternellum present. Anus terminal, with four lobes, lateral lobes broader.

Width of head: 2.0 mm

Materials examined: Kangweon-Do, Kapyong-gun, 15. VI. 1990, From the stems of living willow and Poplar

#### 6. *Apoderus jekelii* Roelofs

거위벌레 (Fig. 6.)

Apoderus: Gardner, 1934, Ind. For Rec., 20 : 60

Body with sparse to abundant setae and moderately dense asperities, thorax slenderer than abdomen.

Head retracted, pale yellow, posterior margin with a large flattened extension under thorax, slightly longer than wide. Antenna with two distinct segments, basal segment ring-like, with three or four minute sensilla and an elongate conical segment. Catapophyses in same plane as frons. Hypopharyngeal bracon absent. Frontal sutures indistinct. Epicranial suture indistinct. Endocarina distinct, approximately half as long as frons. Frons with five pairs of setae, seta 1, 2 and 3 short, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeus with two setae, moderately long, subequal. Labrum trilobed anteriorly, with three pairs of setae and one pair of basal sensillae, posterior margin nearly straight. Labral rods short. Epipharynx with three anterolateral and four anteromedian setae, and four median spines, asperate between rods. Epipharyngeal

sensory pores in two clusters. Mandible with two apical teeth, wide and short. Mandibular seta 1 short, slightly longer than seta 2. Labium longer than wide, with five pairs of setae. Prementum and postmentum fused and equally sclerotised. Ligula about as broad as broad as one labial palpus, palpi separated almost by their one width. Labial palpus with two segments. Basal segment with one short seta and one sensillum, apical segment of maxillary and labial palpi twice as long as wide. Maxillary palpus with two segments, apical segment with one short seta, basal segment transverse, as large as apical segment of labial palpus. Maxillary mala slightly expanded internally on the inner side. Mala with 6 ventral and 10 dorsal setae.

Pronotum with transverse smooth plate.

Spiracle of thorax its place in fore front of mesothorax. Abdomen with eight pairs of spiracles. spiracles without marginal air-tubes, spiracles all lateral. Typical abdominal segment with two dorsal folds, conically humped dorsally, 9th abdominal segment strongly and sharply produced posteriorly. Anus ventral, transverse.

Width of head : 0.9 mm

Materials examined: Kangweon - Do, Hongcheon-Gun, 15. vi 1989.  
*Quecus acutissima*

#### 7. *Byctiscus puberulus regalis* (Roelofs)

단풍나무거위벌레 (Fig. 7.)

Byctiscus: Emden, 1938, Trans. Roy. Ent. Soc. London. 87 : 12

Body moderately stout, with fine setae and minute asperities.

Head retracted, anteriorly brown above, about as long as wide.

Antenna with two distinct segments, basal segment brownish, short, with four minute sensilla and an elongate conical apical segment.

Catapophses in same plane as frons. Hypopharyngeal bracon present. Frontal suture indistinct. Endocarina distinct, approximately half as long as frons. Frons with five pairs of setae and two pairs of sensilla, seta 1 short. Dorsal epicranial setae three paired, two setae along pigmented margin short, with two sensilla. Lateral epicranial setae 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeus with two long setae, subequal. Anterior margin of labrum transverse, posterior margin weakly produced posteriorly. Labrum about 1.4 times as broad as long, with four pairs of setae, one pair near the middle very long, with one pair of basal sensillae. Labral rods moderately slender and long, extend back beyond epistoma. Epipharynx with three anterolateral setae in an oblique line, four anteromedian setae, four median spines and six epipharyngeal sensory pores. Mandible with two apical teeth, without subbasal tooth, mandibular seta 1 short, slightly longer than and directly behind 2. labial palpus with two segments. Prementum with a pair of long setae. Postmentum broadly sclerotized with three pairs of setae in a straight line. Maxillary palpus with three segments, basal segment with one sensillum, apical and middle segment with one sensillum and one short seta, mala consists of two lobes, galea-lobe with five ventral and three dorsal setae, lacinia-lobe with a thorn-like tooth near middle of inner margin, with a short seta near the tooth and four setae near the dorsal margin in a group.

Pronotum with transverse smooth plate.

Abdomen with eight pairs of spiracles. Spiracles all bicameral, marginal air-tubes longer than peritreme. Typical abdominal segments with two dorsal folds. Prodorsum of abdominal

tergites 1-5 with a pair of flat ampullae, posterior fold with six long and four short setae. Anus terminal, surrounded by four lobes.

Width of head: 1.0 mm

Materials examined: Kangweon-Do, Chunsong-Gun, 10. vi. 1990.  
*Polygornum polyneuron*

#### 8. *Euops splendidus* Voss

루리겨우벌레 (Fig. 8.)

Body moderately broad and stout, with sparse to abundant setae and moderately dense asperities.

Head retracted, posterior margin with a larger flattened extension under thorx, as long as wide. Antenna with two distinct segments, basal segment ring-like, with three or four minute sensilla and an elongate conical apical segment. Catapophyses in same plane as frons.

Hypopharyngeal bracon absent. Frontal sutures indistinct., Epicranial suture present. Endocarina distinct, approximately half as long as frons. Frons with five pairs of setae, setae 1, 2 and 3 short subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal with moderately long two setae, subequal, Labrum trilobed at anterior margin, nearly straight at posterior margin, with three pairs of setae and one pair of basal sensilla. Labral rods extend back beyond epistoma. Epipharynx with three anterolateral setae in an obliquely backward line towards anterolateral setae in an obliquely backward line towards the middle, with six anteromedian setae and four median spines. Epipharyngeal sensory pores in two clusters. Mandible with two apical teeth, wide and short. Mandibular



seta 1 short, slightly longer than and directly behind 2. Labium longer than wide, with four pairs of setae, of which one pair on premental area, and with a mask-like posterior extension. Abial palpus with two segments, basal segment with one short seta, basal segment as long as apical segment. Maxillary palpus with two segments, apical segment with two short setae, longer than basal segment, the latter wider than long. Mala with a distinct spine near middle of inner margin and four ventral and eight dorsal setae.

Pronotum with transverse smooth plate.

Abdomen with eight pairs of spiracles, spiracles all lateral, spiracles all bicameral. Typical abdominal segments with two dorsal folds, conically humped dorsally. Postdorsum of abdominal segment with nine or ten setae. Ninth abdominal segment broadly rounded posteriorly. Anus terminal, four lobed.

Width of head: 0.9 mm

Materials examined: Kangweon-Do, Hongchun-Gun, 20. vi. 1990. *Carpinus cordata*

### 9. *Rhynchites heros* Roelofs

복숭아거위벌레 (Fig. 9.)

Body strongly curved, with fine setae, some of them long, and very distinct asperities.

Head retracted, anteriorly brownish above and laterally. Antenna with two distinct segments, the basal segment cylindrical, brownish, a little shorter than broad, with four minute sensilla and a short conical segment. Catapophyses in same plane as frons. Hypopharyngeal bracon present. Frontal suture indistinct. Endocarina distinct, approximately half as long as frons. Frons with five pairs of setae, setae 1, 2 and 3 short, subequal, 4 and long, subequal. Dorsal epicranial setae 1, 3 and

5 long, subequal, 2 moderately long, 4 short. Lateral epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeus with two moderately long setae, subequal. Anterior margin of labrum trilobed, the posterior margin weakly produced posteriorly, with four pairs of setae, one pair near the middle very long, one pair very near the apical margin of the median lobe, with one pair of basal sensilla. Labral rods moderately slender and long, extend back beyond epistoma. Epipharynx with three anterolateral setae, four anteromedian setae and four median spines. Epipharyngeal sensory pores in two clusters. Mandible with two sharp apical teeth and small subbasal tooth, mandible with two sharp apical teeth and small subbasal tooth, mandibular seta 1 short, slightly longer than and directly behind 2. Ligula bilobed. Labial palpus with two segments, apical segment with one short seta. Postmentum with three pairs of setae in a straight line, seta 1 and 2 long, subequal. Sclerotisation of postmentum smaller, not wider than Prementum. Maxillary palpus with three segments, basal segment with one sensillum, apical and median segment with one short seta and one sensillum. Maxillary mala with five ventral and eight dorsal setae, of which four on lacinia-lobe and spinous.

Pronotum with transverse smooth plate. Spiracles bicameral, marginal air-tubs longer than peritreme.

Abdomen with eight pairs of spiracles, spiracles all bicameral. Typical abdominal segments with two dorsal folds. Postdorsum of abdominal segment with many setae. Anus terminal, surrounded by four lobes, transversely X-shaped.

Width of head: 1.2 mm

Materials examined: Kangweon-Do, Chun-

song-Gun, 10. vi.  
1990. Fruit of peach

10. *Sipalinus gigas* (Fabricius)

왕바구미(Fig. 10.)

*Sipalus hypocrita*: Gardner, 1934, Ind. For. Rec., 20 : 40

Body very stout in the middle, rather abruptly narrowed and declivous behind fifth abdominal segment.

Head free, yellowish brown, only slightly longer than wide, broadly rounded posteriorly. Anterior ocellus present, very small. Antenna with small subconical segment and several minute setae. Catapophyses in same plane as frons. Hypopharyngeal bracon readily discernible frontal suture distinct. Endocarina absent. Frons with five pairs of setae, setae 1, 2 and 3 shot to moderately long, subequal, 4 and 5 long, subequal. Dorsal epicranial setae 1, 3 and 5 long, subequal, 2 moderately long, 4 short. Lateal epicranial seta 1 moderately long, 2 long. Ventral epicranial setae short to moderately long, subequal. Four minute posterior epicranial setae present. Clypeal seta 1 short to moderately long, nearly twice as long as 2. Anterior margin of labrum weakly trilobed. A pair of basal sensilla present and lateral sensilla absent on labrum. Labal setae 1 and 2 moderately long, nearly twice as long as 3. Labral rods moderately elongate, stout, U-shaped. Epipharynx with four branched anteolateral setae, six anteromedian branched setae along anterior margin, four median spines and two clusters of sensory pores, densely covered with hair-like asperities. mandible with apex entire, the cutting edge strongly oblique and with a weak angulation near the middle. Mandibular seta 1 short, slightly longer than and directly behind 2. Labial palpus with two segments. Premental

sclerite complete, with anterior and posterior median extensions. Ligula with two pairs of branched setae. Postmentum with three pairs of setae. Maxillary palpus with two segments, basal segment. without accessory process, with one short lateral seta, apical segment without lateral seta, Mala with five branched setae and thirteen branched dorsal setae.

Pronotum with eight setae, strongly transverse. Thoracic spiracle bicameral, without sclerotized peitreme, nearly twice as long as first abdominal spicacle, air-tubes not annulated.

Prodorsum of meso- and metathorax with one short seta. Postdorsum of meso- and metathorax with four setae, seta 1 short, setae 2, 3 and 4 moderately long, subequal. Alar area with one short seta. Spiracular area with two minute setae. Epipleurum with two setae. Pleurum of mesoand metathorax with a seta. Pedal area with seven setae, of which five on oval area. Ventral setae absent.

Abdomen with eight pairs of spiracles. Spiracles all lateral, bicameral, air-tubes very long, without peritreme, posterior pair dorsal between papillae. Typical abdominal segments with three dorsal folds. Sixth abdominal segment abruptly smaller than fifth. Podorsum and postdorsum of typical abdominal segment without setae. Sixth and seventh segment with a seta on epipleurum and pleurum respectively. Eighth segment with a pair and ninth segment with two pairs of finger shaped soft papillae, each papilla with two setae, of which one on top longer. Epipleurum and pleurum subdivided. Anal segment ventral, with four lobes.

Width of head: 3.5 mm

Materials examined: Kangweon-Do, Hoengsong-Gun, 5. vi. 1990.

*Pinus densiflora*

## DISCUSSION

The larvae of the Superfamily Curculionoidea inhabiting in Korea, described and illustrated including three families, ten species.

Four species of attelabidae head retracted, typical abdominal segment with two dorsal folds, body with many setae, antenna with two segment.

Five species of curculionidae head free, typical abdominal segments with three dorsal folds, body with typical number and arrangements of setae, antenna with one segment.

*Sipalinus gigas* (Rhynchophoridae) body length about 26 mm, very stout in the middle, rather abruptly narrowed and declivous behind fifth abdominal segment, eighth abdominal segment with a pair and ninth segment with two pairs of finger shaped soft papillae.

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(1992년 2월 20일 접수)

#### Explanation of each larva (Fig. 1~10)

##### Fig. 1. *Pissodes nitidus* Roelofs

- |  |                     |
|--|---------------------|
| A. Spiracle.                             | B. Mature larva.    |
| C. Anus.                                 | D. Maxilla, dorsal. |
| E. Head.                                 | F. Mandible.        |
| G. Maxilla and labium.                   | H. Antenna.         |
| I. Labrum and epipharynx. Scale : 0.1 mm |                     |

##### Fig. 2. *Pissodes obscurus* Roelofs

- |  |                     |
|--|---------------------|
| A. Spiracle.                             | B. Mature larva.    |
| C. Anus.                                 | D. Maxilla, dorsal. |
| E. Head.                                 | F. Mandible.        |
| G. Maxilla and labium.                   | H. Antenna.         |
| I. Labrum and epipharynx. Scale : 0.1 mm |                     |

##### Fig. 3. *Shirahoshizo insidiosus* (Roelofs)

- |  |                     |
|--|---------------------|
| A. Spiracle.                             | B. Mature larva.    |
| C. Anus.                                 | D. Maxilla, dorsal. |
| E. Head.                                 | F. Mandible.        |
| G. Maxilla and labium.                   | H. Antenna.         |
| I. Labrum and epipharynx. Scale : 0.2 mm |                     |

##### Fig. 4. *Curculio dentipes* Roelofs (Konara)

- |              |                  |
|--------------|------------------|
| A. Spiracle. | B. Mature larva. |
|--------------|------------------|

- |  |                        |
|--|------------------------|
| C. Maxilla, dorsal.                      | D. Head.               |
| E. Mandible.                             | F. Maxilla and labium. |
| G. Antenna.                              |                        |
| H. Labrum and epipharynx. Scale : 0.2 mm |                        |

##### Fig. 5. *Cryptorhynchus lapathi* Linne

- |  |                     |
|--|---------------------|
| A. Spiracle.                             | B. Mature larva.    |
| C. Anus.                                 | D. Maxilla, dorsal. |
| E. Head.                                 | F. Mandible.        |
| G. Maxilla and labium.                   | H. Antenna.         |
| I. Labrum and epipharynx. Scale : 0.2 mm |                     |

##### Fig. 6. *Apoderus jekelii* Roelofs

- |  |                        |
|--|------------------------|
| A. Spiracle.                             | B. Mature larva.       |
| C. Maxilla, dorsal.                      | D. Head.               |
| E. Mandible.                             | F. Maxilla and labium. |
| G. Antenna.                              |                        |
| H. Labrum and epipharynx. Scale : 0.1 mm |                        |

##### Fig. 7. *Byctiscus puberulus regalis* (Roelofs)

- |  |                     |
|--|---------------------|
| A. Spiracle.                             | B. Mature larva.    |
| C. Anus.                                 | D. Maxilla, dorsal. |
| E. Head.                                 | F. Mandible.        |
| G. Maxilla and labium.                   | H. Antenna.         |
| I. Labrum and epipharynx. Scale : 0.1 mm |                     |

##### Fig. 8. *Euops splendidus* Voss

- |  |                        |
|--|------------------------|
| A. Spiracle.                             | B. Mature larva.       |
| C. Maxilla, dorsal.                      | D. Head.               |
| E. Mandible.                             | F. Maxilla and labium. |
| G. Antenna.                              |                        |
| H. Labrum and epipharynx. Scale : 0.1 mm |                        |

##### Fig. 9. *Rhynchites heros* Roelofs

- |  |                     |
|--|---------------------|
| A. Spiracle.                             | B. Mature larva.    |
| C. Anus.                                 | D. Maxilla, dorsal. |
| E. Head.                                 | F. Mandible.        |
| G. Maxilla and labium.                   | H. Antenna.         |
| I. Labrum and epipharynx. Scale : 0.1 mm |                     |

##### Fig. 10. *Sipalinus gigas* (Fabricius)

- |  |                        |
|--|------------------------|
| A. Spiracle.                             | B. Mature larva.       |
| C. Maxilla, dorsal.                      | D. Head.               |
| E. Mandible.                             | F. Maxilla and labium. |
| G. Antenna.                              |                        |
| H. Labrum and epipharynx. Scale : 0.5 mm |                        |

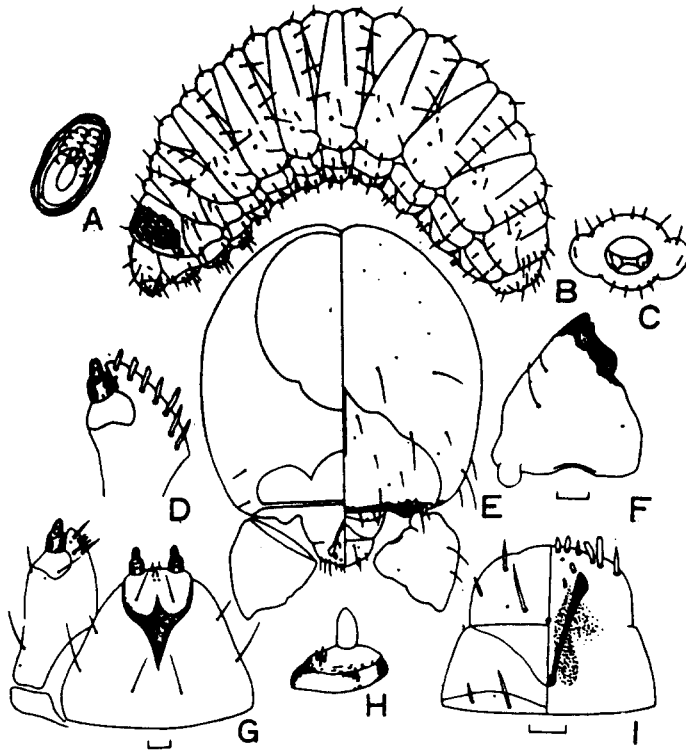


Fig. 1. *Pissodes nitidus* Roelofs

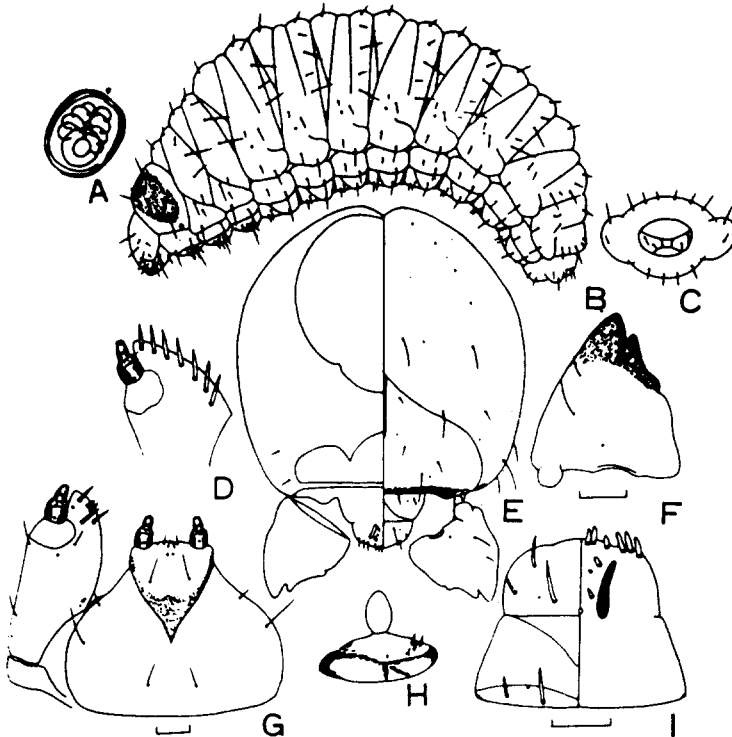


Fig. 2. *Pissodes obscurus* Roelofs

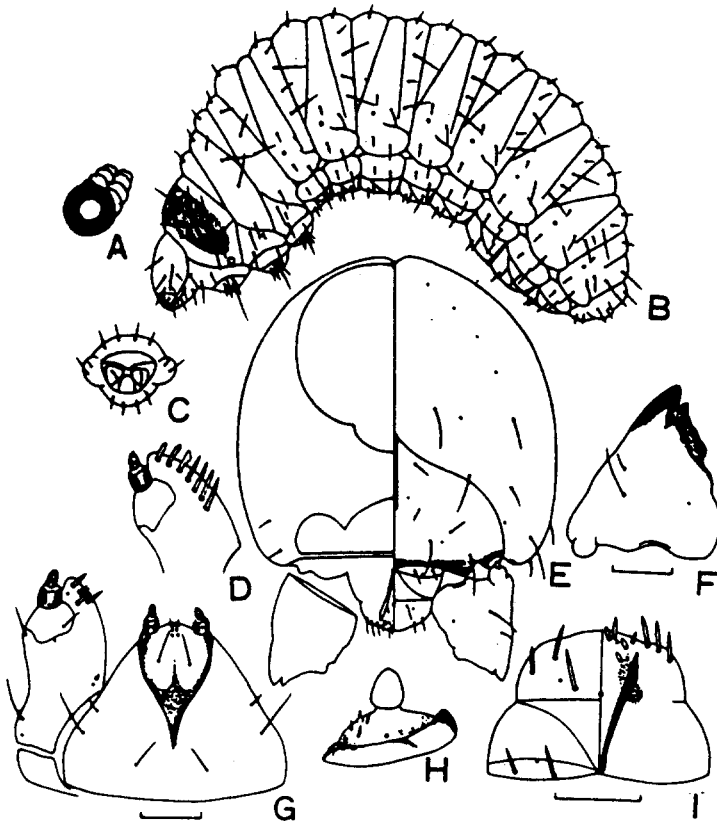


Fig. 3. *Shirahoshizo insidiosus* (Roelofs)

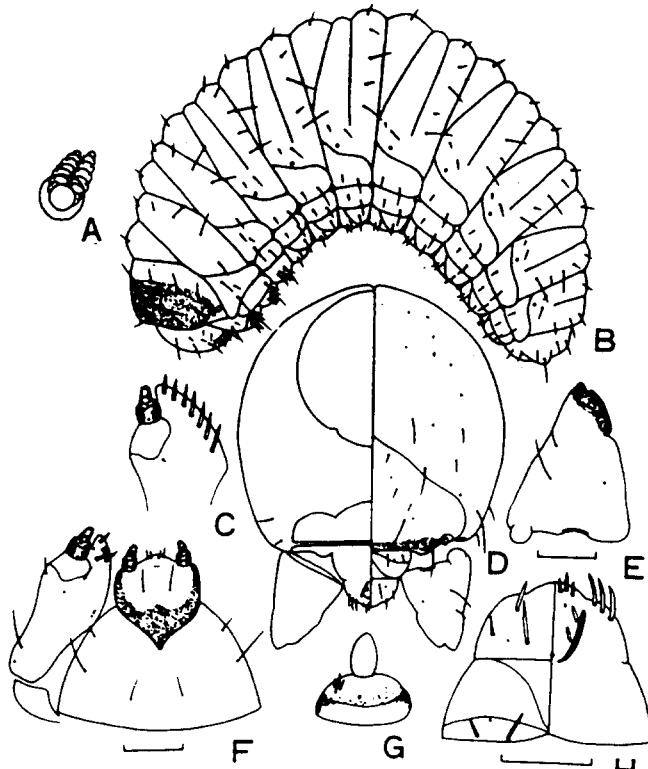


Fig. 4. *Curculio dentipes* Roelofs (Konara)

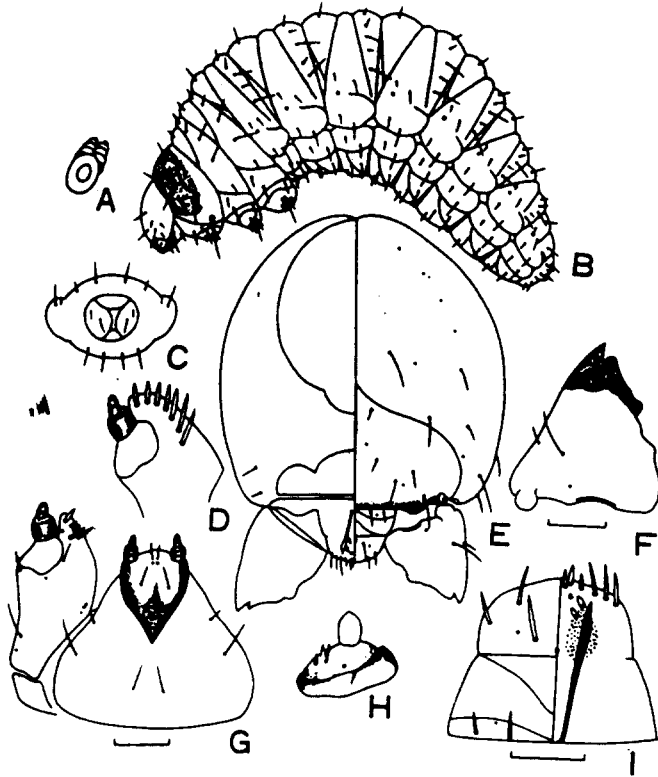


Fig. 5. *Cryptorhynchus lapathi* Linne

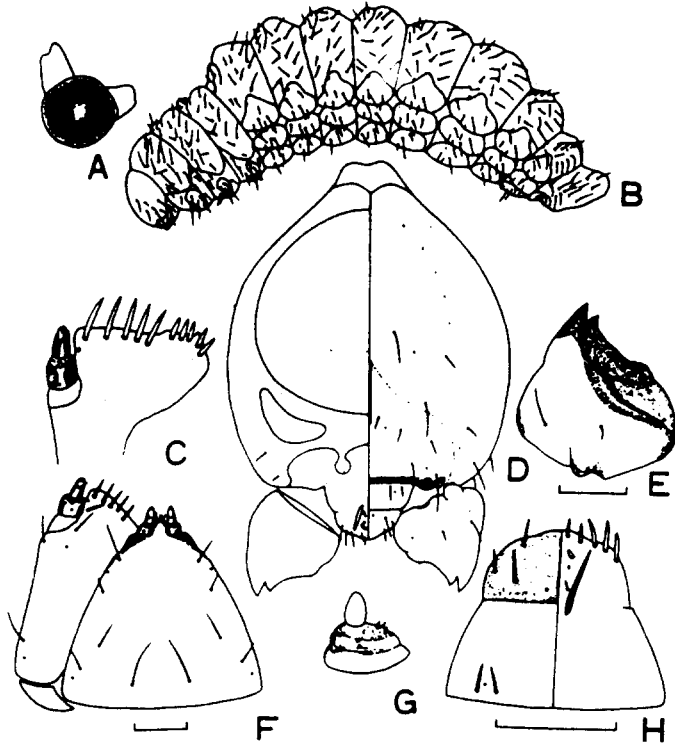


Fig. 6. *Apoderusjekelii* Roelofs

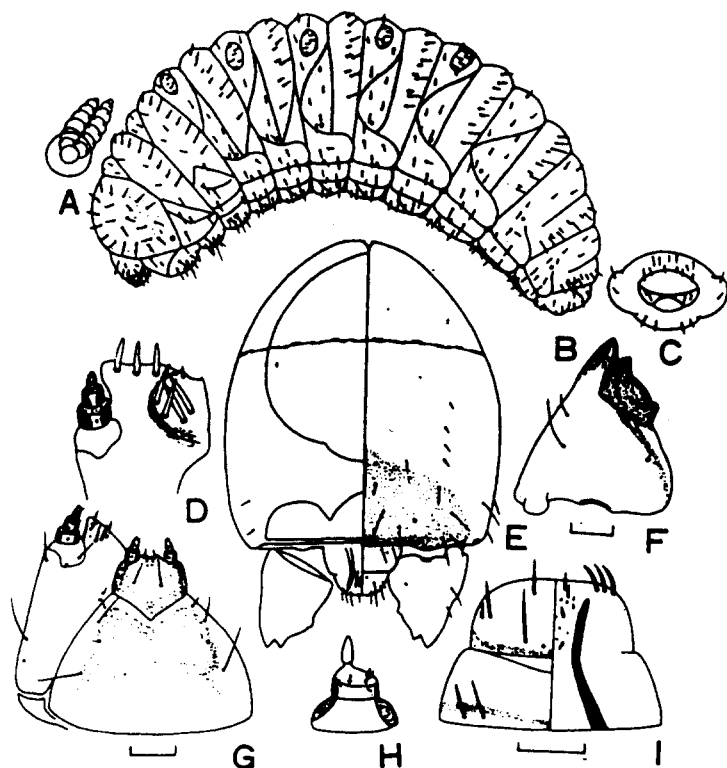


Fig. 7. *Byctiscus puberulus regalis* (Roelofs)

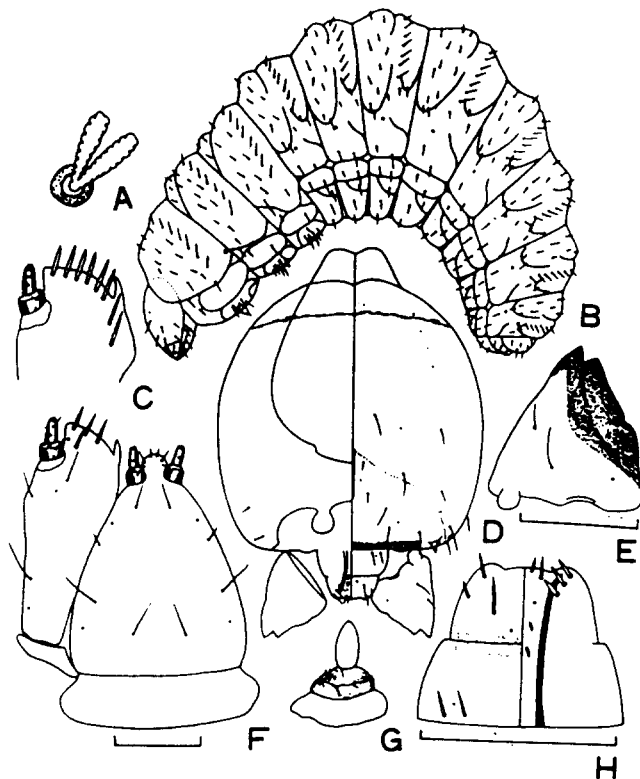


Fig. 8. *Euops splendidus* Voss



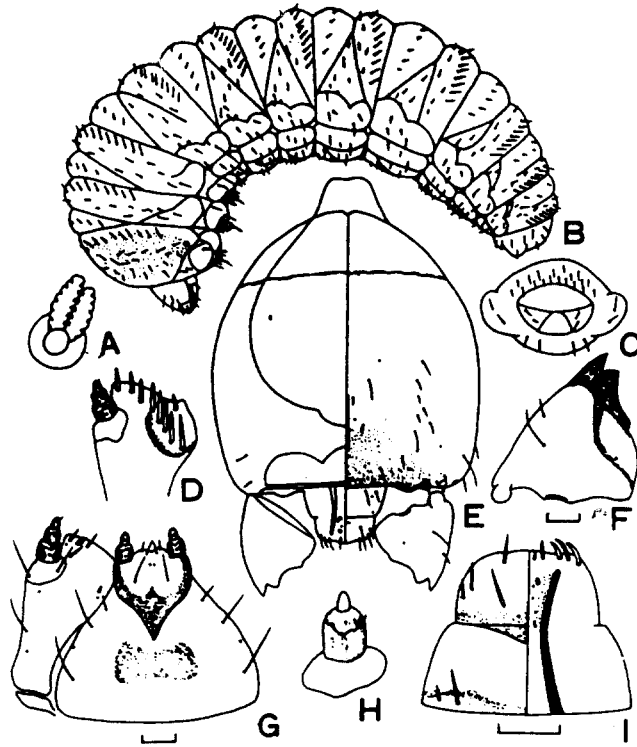


Fig. 9. *Rhynchites heros* Roelofs

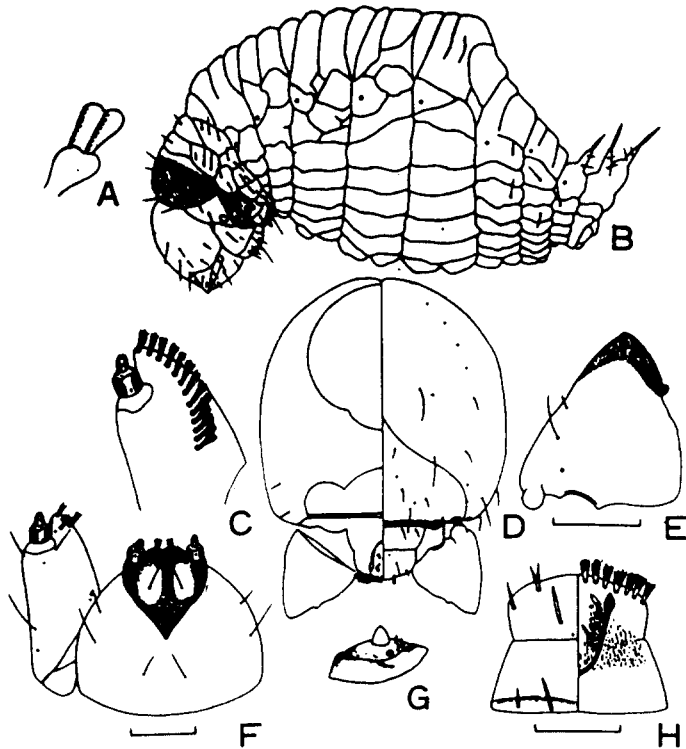


Fig. 10. *Sipalinus gigas* (Fabricius)